



## ABSTRACT OF THE DISCLOSURE

A SAT estimating portion supplies a grip degree estimating portion with the estimated SAT value. A summing device sums a front wheel slip angle on which high  
5 pass filter processing has been performed and a front wheel slip angle on which low  
pass filter processing has been performed so as to obtain an integrated slip angle. A  
grip degree estimating portion estimates a grip degree of a tire, by calculating a SAT  
reference value which is based on the integrated slip angle, and calculating a ratio  
between the SAT reference value and the estimated SAT value. A road surface  $\mu$   
10 value estimating portion estimates a road surface  $\mu$  value when the grip degree  
becomes equal to or lower than a reference value.